

Babesiosis

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Babesiosis is caused by microscopic parasites (protozoa) of the genus *Babesia*. The species responsible for disease in humans in the United States is *B. microti* and its close relatives.

B. Clinical Description

Many of the clinical features of babesiosis resemble malaria, including loss of appetite, fatigue, and a fever as high as 104°F. Fever may be recurrent. Patients also report chills, sweats, muscle and joint pain, and nausea. The protozoa infect red blood cells and eventually destroy them, leading to anemia, a swollen liver and an enlarged spleen. For most patients, recovery is spontaneous and the illness is relatively mild. However, the clinical course of babesiosis is worse among individuals who are immunocompromised, who have no spleen, who have a dysfunctional spleen, or who are over the age of 60. When indicated, treatment is with antibiotics. Coinfections with the infectious agent of Lyme disease or other pathogens carried by ticks may complicate the clinical picture and lead to a more serious illness.

C. Vectors and Reservoirs

The primary vectors for babesiosis are *Ixodes* ticks, a distinct genus from the larger and better-known dog tick (*Dermacentor variabilis*). In Massachusetts, the prominent vector is *I. scapularis*, or the deer tick. This is the same tick that carries and transmits the agents of Lyme disease and ehrlichiosis (see chapters on these other diseases). Ticks acquire the protozoa that cause babesiosis during their young, larval stage by feeding on infected animals, particularly the white-footed deer mouse. During its next (nymphal) stage of life, the tick poses the greatest threat of transmitting infectious organisms to animals and humans it bites. Nymphs are most abundant between May and July, and they are typically found in grasses and brush. Towards the end of summer through fall, nymphs mature to the adult stage. Although adult ticks remain capable of transmitting *B. microti* to humans, they are less likely to do so.

D. Modes of Transmission

Babesiosis is acquired from a tick bite. However, bites from *I. scapularis* are often painless and may occur on parts of the body that are difficult to observe, so cases may have no known history of a tick bite. Since *I. scapularis* also transmits *Borrelia burgdorferi*, the bacterium that causes Lyme disease, as well as the agent of human granulocytic ehrlichiosis, coinfection is possible. Under rare circumstances babesiosis is transmitted by blood transfusion.

E. Incubation Period

The incubation period ranges from 1 to 8 weeks, although occasionally it can be longer.

F. Period of Communicability or Infectious Period

With the exception of direct blood transfusion, babesiosis is not communicable from person-to-person. Cases should be excluded from blood donation.

G. Epidemiology

The incidence of babesiosis is associated with the density of infected tick vectors and their animal hosts. As with Lyme disease, most cases of babesiosis arise during the summer and early fall. Cases have been reported in eight states, including Massachusetts, Rhode Island, Connecticut and New York. Most cases in

Massachusetts are reported from Cape Cod, Martha's Vineyard and Nantucket. In endemic areas cases are often asymptomatic.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. What to Report to the Massachusetts Department of Public Health

- Any person with a positive identification of *Babesia* on blood smear, or
- Suspect cases with positive serologic results.

Note: See Section 3) C below for information on how to report.

B. Laboratory Testing Services Available

Laboratory confirmation is by Giemsa or Wright-stained blood smears. Multiple thick and thin smears may be necessary to identify the parasite. Serological assays for anti-*Babesia* antibodies are becoming more common, although as of this writing have not been standardized. Laboratory testing for babesiosis is not available on site at the State Laboratory Institute (SLI). At present, the SLI, Virus Serology Laboratory will forward specimens to the Centers for Disease Control and Prevention (CDC) for babesiosis testing. For additional information on submitting samples, contact the Virus Serology Laboratory at (617) 983-6396.

Note: The SLI does not provide services for tick identification or testing of ticks for *Babesia*.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify the prevalence of babesiosis in Massachusetts.
- To identify where babesiosis occurs in Massachusetts.
- To recognize areas in Massachusetts where babesiosis incidence has increased or decreased.
- To focus preventive education.
- To target tick control measures.

B. Laboratory and Healthcare Provider Reporting Requirements

Please refer to the lists of reportable diseases (at the end of this manual's introductory section) for specific information.

C. Local Board of Health Reporting and Follow-up Responsibilities

1. Reporting Requirements

Massachusetts Department of Public Health (MDPH) regulations (*105 CMR 300.000*) stipulate that each local board of health (LBOH) must report the occurrence of any case of babesiosis, as defined by the reporting criteria in Section 2) A. Current requirements are that cases be reported to the MDPH Division of Epidemiology and Immunization, Surveillance Program using an official MDPH *Babesiosis Case Report* form (in Appendix A). Refer to the *Local Board of Health Reporting Timeline* (at the end of this manual's Introduction) for information on prioritization and timeliness requirements of reporting and case investigation.

2. Case Investigation

- a. It is the LBOH responsibility to complete MDPH *Babesiosis Surveillance Case Report* form (Appendix A) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the case's healthcare provider or the medical record.
- b. Use the following guidelines to assist you in completing the form:

- 1) Accurately record the demographic information, occupation, whether hospitalized (including location and associated dates), date of symptom onset, symptoms, laboratory information, treatment information, healthcare provider information, and outcome of disease (*e.g.*, recovered, died).
 - 2) Exposure history: use the incubation period range for babesiosis (1–8 weeks). Specifically, focus on the period beginning a minimum of 1 week prior to the case's onset date back to no more than 8 weeks before onset date for the following exposures:
 - a) Tick bite history: determine if the case was bitten by a tick. If yes, ask and record information about the duration of tick attachment, date(s) and geographic location(s) where he/she was bitten.
 - b) Travel history: determine the geographic area(s) visited by the case, including known areas of high risk, such as Cape Cod, Martha's Vineyard and Nantucket.
 - c) Pet/animal exposure: determine if the case owns a pet or otherwise had contact with dogs, cats, or other animals.
 - 3) If the case was diagnosed at the same time with another tick-borne disease, such as Lyme disease, ehrlichiosis, or Rocky Mountain spotted fever, please refer to other chapters of this manual and complete the appropriate forms.
 - 4) If you have made several attempts to obtain case information, but have been unsuccessful (*e.g.*, the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason why it could not be filled out completely.
- c. After completing the form, attach lab report(s) and mail (in an envelope marked "Confidential") to the MDPH Division of Epidemiology and Immunization, Surveillance Program. The mailing address is:
MDPH, Division of Epidemiology and Immunization
Surveillance Program, Room 241
305 South Street
Jamaica Plain, MA 02130
- d. Institution of disease control measures is an integral part of case investigation. It is the LBOH responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4), Controlling Further Spread.

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (105 CMR 300.200)

Minimum Period of Isolation of Patient

No restrictions except appropriate exclusion from blood donation.

Minimum Period of Quarantine of Contacts

No restrictions.

B. Protection of Contacts of a Case

None.

Note: As mentioned in Section 1) F, babesiosis is not communicable from person-to-person (with the exception of direct blood transfusion). Cases should be excluded from blood donation for at least as long as the protozoa remain in the blood.

C. Managing Special Situations

None.

D. Preventive Measures

Environmental Measures

Prevention of babesiosis involves making your yard less attractive to ticks.

- Remove leaf litter and brush from around your home.
- Prune low-lying bushes to let in more sunlight.
- Mow lawns regularly.
- Keep woodpiles in sunny areas, off the ground.
- If you are going to use insecticides around your home, always follow the label instructions and never use near streams or other bodies of water.

Personal Preventive Measures/Education

The best preventive measure is to avoid tick-infested areas. In areas where contact with ticks may occur, individuals should be advised of the following:

- Wear long-sleeved shirts and long, light-colored pants tucked into socks or boots.
- Stay on trails when walking or hiking and try to avoid high grass.
- Properly use insect repellants. Repellants that contain DEET (diethyltoluamide) should be used in concentrations no higher than 15% for children and 30% for adults. Remember, repellants should *never* be used on infants. Permethrin is a repellant that can only be applied onto clothing, *not* exposed skin.
- After each day spent in tick-infested areas, check yourself, your children, and your pets for ticks. Parts of the body ticks like most include the back of the knee, armpit, scalp, groin, and back of the neck. The stage of the deer tick most likely to transmit babesiosis (the nymphal stage) is very small, about the size of a poppy seed.
- Promptly remove any attached tick using fine-point tweezers. The tick should not be squeezed or twisted, but grasped close to the skin and pulled straight out with steady pressure. Once removed, the tick should be drowned in rubbing alcohol or in the toilet.

ADDITIONAL INFORMATION

There is currently no formal CDC surveillance case definition for babesiosis. (CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting.) For reporting a case to the MDPH always refer to the criteria in Section 2) A of this chapter.

REFERENCES

American Academy of Pediatrics. *1997 Red Book: Report of the Committee on Infectious Diseases*, 24th Edition. Illinois, American Academy of Pediatrics, 1997.

CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR*. 1997; 46:RR-10.

Chin, J., ed., *Control of Communicable Diseases Manual*, 17th Edition. Washington, DC, American Public Health Association, 2000.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases and Isolation and Quarantine Requirements*. MDPH, Promulgated November 1998 (Printed July 1999).